

# ABHAY VENKATESH

CURRICULUM VITAE

As of June 9, 2021

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## OVERVIEW

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- Abhay Venkatesh is a *Tech Lead* at Anduril Industries, where he focuses on Autonomy Infrastructure, Simulation Infrastructure, Command-And-Control, and Lattice
- Abhay is mentored by **Jared Newman**, *Head of Platform* at Anduril, and **Nabil Enayet**, *Group Lead for Platform* at Anduril
- Prior to his Tech Lead role, Abhay worked directly under **Brian Schimpf**, *CEO and Co-Founder of Anduril*, and *ex-Director of Engineering at Palantir*, on Perception problems ranging from Edge Inference, Quantized Learning and Inference, to Object Detection and Mapping
- Abhay has also worked at Facebook as a *Software Engineer Intern* on the News Feed Integrity Team, where he worked on machine learning, modeling, and product to improve the quality of the Facebook News Feed
- At Stanford University, Abhay was a *Research Intern* working on Robotics, Human-Computer Interaction, and Software Platform research advised by **Dr. Wendy Ju**, and **Dr. Michael Bernstein**
- Abhay graduated from the University of Wisconsin-Madison with *Distinction and Departmental Honors with a Bachelor of Science in Computer Sciences and Mathematics*
- At the University of Wisconsin-Madison as an *Research Assistant*, Abhay worked on Computer Science research, focusing on Machine Learning, Computer Vision, Robotics, Human-Computer Interaction, Internet of Things, and Big Data Systems
- For his Machine Learning and Computer Vision Research, Abhay was advised by **Dr. Vikas Singh**, *Professor of Computer Science and Bioinformatics* at the University of Wisconsin-Madison
- For his Big Data Systems Research, Abhay was advised by **Dr. Shivaram Venkataram**, *Assistant Professor of Computer Science* at the University of Wisconsin-Madison
- For his Human-Computer Interaction and Robotics Research, Abhay was advised by **Dr. Bilge Mutlu**, *Professor of Computer Science* at the University of Wisconsin-Madison
- In High School, Abhay was the *Valedictorian* for his breadth of excellence ranging from music and competitive quizzing to academics and entrepreneurship

## EXPERIENCE

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**Anduril Industries**  
*Software Engineer*

Irvine, CA  
May 2019 —

- Command-And-Control Architecture
- Simulation Infrastructure
  - Tech Lead and Product Manager
- Management
  - Implemented new RFC system
  - Implemented new ownership model
  - Thought Leadership through Anduril's internal Platform Blog (e.g. released "Platforms vs. Algorithms" piece)
- Mission Autonomy Architecture

- APIs
- Backend Services
- Sensor Infrastructure Architecture
- C++ Infrastructure Architecture
  - Application Infrastructure
  - Core Libraries
  - Build Infrastructure
- Networking/Data Systems Backend
  - Bandwidth Efficient Pub/Sub
- Systems Software - Hardware Images
  - Sentry Tower, Ghost, Dust
- Perception
  - Mapping
  - Object Detection
  - Quantized Learning and Inference

**University of Wisconsin-Madison**  
*Research Assistant*

Irvine, CA  
 September 2016 — May 2019

- Machine Learning and Computer Vision Research under Dr. Vikas Singh
  - Research topics included Novel Activation Functions, Semi-Supervised Learning, Computer Vision, Semantic Segmentation, Data-Dependent Regularizers, Drones
  - Industrial Collaboration with American Family Insurance targeting automated insurance claim verification
- Big Data Systems Research under Dr. Shivaram Venkataraman
  - Research topics included machine learning, data loading, cluster scheduling
  - Industrial collaboration with Microsoft Research
- Robotics and HCI Research under Dr. Bilge Mutl
  - Research focus on Collaborative Industrial Robots
  - In collaboration with MIT CSAIL
- IoT Research at the IoT Lab focusing on Computer Vision and Smart Homes

**Facebook, Inc.**  
*Software Engineer Intern*

Menlo Park, CA  
 May 2018 — August 2018

- News Feed Integrity Team
- Broad Trust: built data models and analytics dashboards for i8n launch
- Common Ground and Polarization: built new ranking algorithm based on an unsupervised model, ran experiment on 1% of Facebook's users
- Article Context: built article-to-context mapping system with 99% precision and 99% recall
- Received full-time return offer

**Stanford University**  
*Research Intern*

Stanford, CA  
 June 2017 — September 2017

- Multi-Robot Interaction project under Dr. Wendy Ju

- Daemo, a crowdsourcing platform, under Dr. Michael Bernstein

## Startup at Top Business School

*Product Manager Intern*

May 2016 — August 2016

- Market research, pricing analysis, competitive analysis
- UX research, helped identify improvements to reduce attrition by 15%

## EDUCATION

<b>Stanford University</b>	Stanford, CA
Computer Science (Non-Degree)	<i>Summer Session (GPA 4.0)</i>
<b>University of Southern California</b>	Los Angeles, CA
B.S. Computer Science	<i>Admitted but did not enroll</i>
<b>University of Wisconsin-Madison</b>	Madison, WI
B.S. Mathematics, Computer Sciences (Honors)	<i>Graduated with Distinction</i>

## PUBLICATIONS

**Generating Accurate Pseudo-Labels in Semi-Supervised Learning and Avoiding Overconfident Predictions via Hermite Polynomial Activations**, CVPR 2020

**Generating Accurate Pseudo-labels via Hermite Polynomials for SSL Confidently**, MMLS 2019, Best Student Paper

**Nondecomposable Data Dependent Regularizers offer Significant Performance Gains**, DeepMath 2019

**Optimizing Nondecomposable Data Dependent Regularizers via Lagrangian Reparameterization offers Significant Performance and Efficiency Gains**, AAAI 2019, Ranking method on the Microsoft COCO Leaderboard

**The Case for Unifying Data-loading in Machine Learning Clusters**, HotCloud 2019, In Collaboration with Microsoft Research

**Learning View Invariant Semantic Segmentation for UAV Video Sequences**, SDM 2018, In Collaboration with American Family Insurance Research

## TEST SCORES

**GRE Composite** 336 out of 340

**GRE Analytical Writing** 99th Percentile

**GRE Verbal Reasoning** 98th Percentile

**SAT Math** 97th Percentile

## HIGHLIGHTED COURSEWORK

**Stanford CS 161** *Design and Analysis of Algorithms*

**UW-Madison CS 838** *Graduate Learning Methods in Computer Vision*

**UW-Madison CS 766** *Graduate Computer Vision*

**UW-Madison CS 760** *Graduate Machine Learning*

**UW-Madison CS 744** *Graduate Big Data Systems*

**UW-Madison CS 564** *Database Management Systems*

**UW-Madison CS 540** *Artificial Intelligence*

**UW-Madison CS 537** *Operating Systems*

**UW-Madison Math 531** *Advanced Probability Theory*

**UW-Madison Math 525** *Linear Programming*

**UW-Madison Math 521** *Analysis I*

**UW-Madison Math 522** *Analysis II*

## AWARDS

<b>Edison Award</b>	USA
<i>Awarded to Anduril for the Ghost Product which Abhay contributed to</i>	2021
<b>Best Student Paper</b>	USA
<i>Midwest Machine Learning Symposium</i>	2019
<b>Cornell, Maryland, and Max Planck Pre-Doctoral Research Fellowship</b>	Germany
<i>Internationally recognized award, fully-funded seminar at the Max-Planck Institute</i>	2018
<b>Hilldale Undergraduate Research Fellowship</b>	Madison, WI
<i>Research award and funding</i>	2018
<b>Phi Kappa Phi Nominee</b>	Madison, WI
<i>Top 7.5% of all juniors</i>	2018

<b>Course Citation</b>	Madison, WI
<i>CS 564: Database Management Systems</i>	
<i>Won a Google Home for being the most active student on the course's discussion board</i>	2018
<b>The Hub CS Club Coding Competition</b>	Madison, WI
<i>1st place</i>	March, 2017
<b>Award Winning Exhibit</b>	Madison, WI
<i>Wisconsin Engineering EXPO</i>	March, 2017
<b>Dean's Award of Excellence</b>	Madison, WI
<i>Awarded to Madison Enactus for which Abhay was the VP of Technology</i>	2016
<b>Best Social Entrepreneurship Project, Transcend</b>	Madison, WI
<i>Awarded to Madison Enactus for which Abhay was the VP of Technology</i>	2016
<b>John W. Jung Memorial Scholarship</b>	Madison, WI
<i>Awarded by UW-Madison for leadership, excellence, and service.</i>	2016
<b>Dean's List</b>	Madison, WI
<i>University of Wisconsin-Madison</i>	2016
<b>High School Valedictorian</b>	
<i>To the best overall student</i>	December, 2014
<b>National 3rd Place in Top Tech Quiz</b>	
<i>World's Largest High School Tech Quiz</i>	
<i>Prestigious national award out of 15,000 participants across the country</i>	December, 2014
<b>Acknowledgement by Head of State</b>	
<i>For Founding a Successful Not-For-Profit</i>	December, 2014
<b>State Recommendation</b>	
<i>For Founding a Successful Not-For-Profit</i>	December, 2014

#### LEADERSHIP

<b>Judge</b> <i>Contrary Talent Hacks</i>	February, 2021
<b>Judge</b> <i>DubHacks</i>	October, 2020
<b>Judge</b> <i>HackThis by HackIllinois</i>	August, 2020
<b>Judge</b> <i>GarudaHacks</i>	August, 2020
<b>President, Co-Founder</b> <i>AI at UW, ai.cs.wisc.edu</i>	2017
<b>VP of Technology</b> <i>Madison Enactus</i>	2016
<b>Executive</b> <i>The Hub CS Club</i>	2016
<b>Chief Technology Officer</b> <i>Insight Wisconsin</i>	2016
<b>Executive</b> <i>Transcend</i>	2015
<b>Co-Founder</b> <i>Model United Nations</i>	2014
<b>Co-Founder</b> <i>Soccer Cup</i>	2014
<b>Co-Founder</b> <i>Student Parliament</i>	2013
<b>Quizmaster</b> <i>Top Engineering University</i>	2013

#### ORGANIZATIONS

**Contrary Talent** 2020 Fellow, Around 100 selected from a highly competitive pool of 2200+ top early-career professionals in the USA

#### PROJECTS

**Simulation Platform Infrastructure** Simulation platform infrastructure for robots, Kubernetes for container orchestration, GoLang for backend systems, Python for scripting

**Command-And-Control Framework** A framework for writing command-and-control applications, implemented using Protocol Buffers

**Efficient Pub-Sub on Mesh Network** Bandwidth-efficient distributed publish-subscribe system implemented in GoLang

**C++ Polyrepo with Nix** A novel polyrepo architecture for C++ projects using Nix

**Mission Autonomy System** Ground-breaking complex distributed system for robots implemented in C++ and GoLang

**Space Sensor Network** Simulated space sensor network for tracking satellites, backend using GoLang, sensor simulation using Python

**Drone Mapping System** Generating 2D maps from overhead imagery extracted from a drone, backend systems using GoLang

**Drone Object Detection System** Detecting objects on a drone, Nvidia Tegra and TensorRT

**Quantized Inference** Quantized learning and inference for low-power edge devices, models trained in PyTorch and TensorFlow, Google Edge TPU for inference

**OneAccess** Data loading system for machine learning implemented with Python

**Learning with Hermite Polynomials** Demonstrating superior semi-supervised learning with Hermite Polynomials, models trained using PyTorch

**Data-Dependent Regularizers** Learning semantic segmentation with data-dependent regularizers, models trained using PyTorch, built custom optimizer for novel iterative gradient algorithm

**Conditional Drones** Generating training data for drone vision models using conditional generative adversarial networks, dataset generated using Python and Unreal Engine, models trained using PyTorch

**Diabetic Retinopathy Detection** Detecting diabetic retinopathy using K-Nearest Neighbors, Logistic Regression, LeNet, GoogLeNet, models trained using Python and TensorFlow

**View-Invariant Semantic Segmentation** Learning view-invariant semantic segmentation for UAVs, dataset generation using Python and Unreal Engine, model training and inference using TensorFlow

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#### SKILLS

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**Programming Languages** C++, GoLang, Python, Nix, Java, JavaScript, Bash

**Domain Expertise** Backend Product, Backend Systems, Robotics, Big Data Systems, Machine Learning, Computer Vision, C++ Infrastructure, Cloud Deployment, CI/CD

**Technologies** PyTorch, Docker, Kubernetes, TensorFlow, CircleCI, Git/GitHub, Linux

**Business** Technical Leadership, Entrepreneurship, Backend Product Management, Technical Writing, Sprint Management, Technical Execution, Computer Science Research

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#### REFERENCES

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**Jared Newman**, Head of Platform at Anduril Industries

**Nabil Enayet**, Platform Group Lead at Anduril Industries

**Dr. Vikas Singh**, Professor of Computer Sciences and Bioinformatics at the University of Wisconsin-Madison

**Brian Schimpf**, CEO and Co-Founder at Anduril Industries, ex-Director of Engineering at Palantir

**Dr. Shivaram Venkataraman**, Assistant Professor of Computer Sciences at the University of Wisconsin-Madison

**Dr. Theodoros Rekatsinas**, Assistant Professor of Computer Sciences at the University of Wisconsin-Madison

**Dr. Bilge Mutlu**, Professor of Computer Sciences at the University of Wisconsin-Madison